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A Remarkable form of Sexual Dimorphism in a Centipede (Chilopoda: Lithobiomorpha: Lithobiidae)

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It is well known among students of Chilopoda that when sexual dimorphism is at all apparent in centipedes, it nearly always manifests itself in relatively few structures at the hind end of the body. The presence of egg claspers only in female anamorphic centipedes, the frequent intersexual differences in shape and position of the gonopods of the Epimorpha, the often pronounced secondary sexual modifications in the last one or two pairs of legs of some male lithobiomorphs, the swollen ultimate legs of many male geophilomorphs, the sexually dimorphic differences in shape and size of certain posterior tergites and sternites in some species—all represent familiar and predictable instances of sexual dimorphism. All seem directly or indirectly associated with some phase of reproduction, and all are manifest in posterior structures. To this list may be added two notable dimorphic characters involving the entire body. In most female centipedes over-all body size tends to exceed that of the males, and most geophilomorph females have pedal segment numbers whose modes tend to be higher than those of conspecific males. In contrast to the foregoing, examples of conspicuous sexual differences in *anterior* body structures are virtually unknown and must be presumed to be exceedingly uncommon in nature.

Some years ago Mr. R. L. Hoffman presented me with a collection of small lithobiids which he had captured in the mountains of southwestern Virginia. Several of these specimens, all females, were readily identified as *Paitobius zinus* (Chamberlin),[1] a rather uncommon and distinctive montane species.

A subsequent collection included what was clearly a male of *zinus,* a specimen unlike any of which I had ever seen or read. Its prehensors were not of the short, robust type that is essentially unvarying in general form in both sexes throughout the order. Instead, they were enlarged and more elongate, curiously distorted, and grotesque even for a chilopod.

It seemed reasonable at the time to regard the whole prehensorial apparatus as anomalous, a teratoid freak of development, unique and not normally duplicable. The examination of additional *zinus* specimens showed, however, that this explanation was incorrect. The total, final series consisted of a dozen females, each with normal prehensors, and of eight males, each with the aberrant prehensors of the original male. Such evidence suggests that the prehensors of this species are regularly sexually dimorphic.

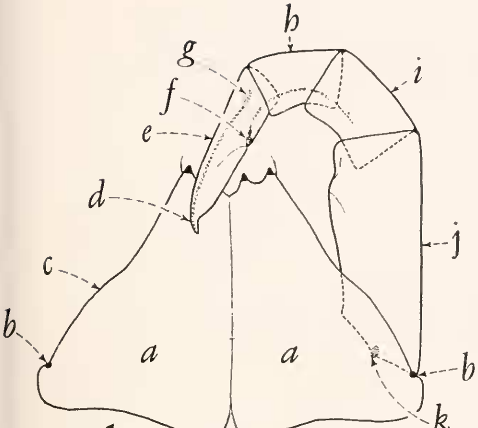
Fig. 3 presents a dorsal view of the male's head and associated structures. The enormous prehensors are seen *in situ* extending widely laterally from the basal underside of the head: the left prehensor is flexed, the right is partly extended. Note the extraordinary width of their basal axis and their remarkable projection forward. By contrast, the female's prehensors are but slightly exposed laterally and not at all exposed anteriorly.

[1] *Paitobius,* a heterogeneous group, is largely restricted to the middle and southern Appalachian Mountains. The reader is referred for its identification to R. V. Chamberlin, Bull. Mus. Comp. Zool. Harvard 57(6) : 279, 1922. The present form belongs to that ensemble of species characterized by the presence of an inner accessory claw on the ultimate pretarsus, and tergital productions only on 11 and 13. It may be distinguished from these through its possession of the following additional characters in combination: apices of prosternal teeth straight or slightly recurved, not procurved; 13D + 14D = 10311, 14V = 01331; female prehensors normal but those of male modified as described below. To date *zinus* has been recorded from Virginia, North Carolina, Tennessee, Georgia, and Alabama.

Figs. 1 and 2, respectively, represent in ventral aspect the male and female prehensorial structures. They are comparably enlarged and prepared from specimens of about the same body size. The most notable specific departures of the male apparatus include the following:

The trochanteroprefemur (j) is relatively longer, thinner, and more cylindrical that that of the female. Its outer surface in outline is almost perfectly straight, and its inner surface bears a conspicuous swelling toward its distal end. It is particularly interesting to note that the ventral condyle (b) is displaced nearly to a lateral position from its normal location under (ventral to) the concealed dorsal condyle (k). (Cf. fig. 2, k, b.) In most chilopods these condyles more or less overlie one another; moreover, similar but less pronounced lateral displacement of the ventral condyle is characteristic only of the Scutigeromorpha. Although it is tempting to speculate upon the possibility that this lithobiid prehensor evidences certain atavistic features reflective of the common evolutionary stem from which the Lithobiomorpha and Scutigeromorpha probably arose, I believe that the condylic displacement in *sinus* males has a simpler explanation. The similarity is probably only analogous, an example of convergency, since, from the purely mechanical standpoint, comparably long and heavy telopodites of this sort probably require comparable basal articulatory devices if they are to function effectively. We must not forget that the genetic factors that gave rise to the long, ponderous telopodites had also to provide for their effective operation. If this were not the case, then, burdened with appendages of little or no use for capturing and subduing prey, the males would undoubtedly die of starvation before reaching sexual maturity, and the pertinent causative gene or genes might be expected to vanish with them.

Of particular significance is the length-to-width ratio of the intermediate articles, i.e., of the femoroid (i) and tibioid (h). Note that in the male each is much longer than wide. In the female, and in all other lithobiomorphs, each article normally is much wider than long. Again, the intermediate articles of the male are curiously suggestive of their homologues in the Scutigeromorpha and of none in any other order.



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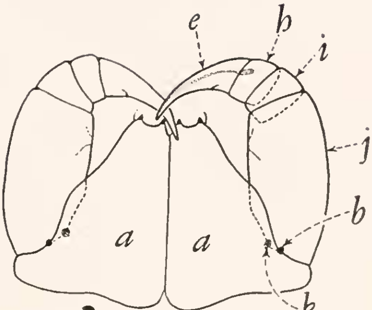

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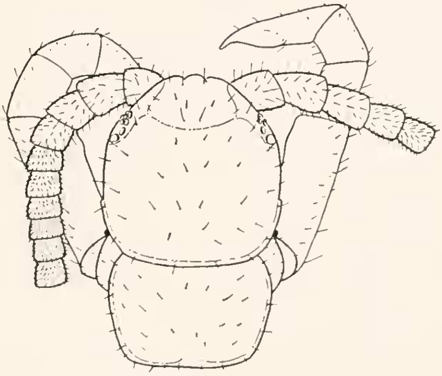

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Fig. 1. Prosternum and left prehensor of male. Ventral aspect; all setae deleted. a + a = prosternum, morphologically the two imperfectly fused coxal portions of the telopodites. b = ventral condyle. c = lower lateral bulge of prosternal margin. d = modified apex of tarsungula. e = tarsungula. f = vestigial division of tarsal and pretarsal portions of tarsungula; also point of attachment of pretarsal depressor ligament (represented in dashes). g = poison calyx with distally extending poison canal. h = tibioid. i = femoroid. j = trochanteroprefemur, morphologically the fused trochanter and prefemur (2nd trochanter). k = dorsal, concealed condyle.

Fig. 2. Prosternum and both prehensors of female. Ventral aspect; all setae deleted. Letter designation as in fig. 1.

Fig. 3. Head and adjacent structures of male. Dorsal aspect. All setae shown; part of each antenna deleted.

The male's tarsungula (e) is unique. Fig. 1 shows that the tarsal portion,[2] which is proximal to (f), is essentially normal if we discount its being greatly flattened dorso-ventrally, but the ungular portion distal to (f) is most peculiar. It is flattened dorso-ventrally, its dorsal and ventral surfaces being nearly appressed, and it is very weakly attenuate except at its extreme tip which is abruptly pointed. (Cf. fig. 2.) The condition is probably unique among centipedes. Note too that the pretarsal depressor ligament attaches at its customary position (f), and that the poison calyx (g) is normal in shape and size but housed entirely within the tarsal portion. In the female it extends into the tibioid. Finally, the male's prosternum (a + a) has oddly raised lateral margins, whereas on each side of the midlongitudinal suture its surface is broadly concave. In the female the margins are not raised, and the ventral surface is slightly convex.

On the basis of such a small series of specimens, and in view of our total ignorance of chilopod genetics, it is not possible convincingly either to suggest how this peculiar condition arose, or to speculate upon its possible evolutionary implications. Our few observations suggest the possibility of its being regularly present in the males and regularly absent in the females, but we do not know that this is actually the case. The possibility that this aberrant structure occurs in *some* unexamined females or that it is absent in *some* unexamined males, for instance, would have an important bearing upon the question of its genetic basis, for if this were true, we might reasonably suspect some form of sex-linked rather than of sex-limited inheritance to be involved.

It is reasonable to suggest at least that the character is the phenotypic expression of a genetic mutation of some sort that is either: (A) more frequent or widespread in the males than in the females, for which it may or may not be lethal; or: (B) it is common to some or to all males and to no females.

[2] The tarsungula of the Lithobiomorpha, Geophilomorpha, and Scolopendromorpha represents an amalgamation of the morphological tarsus and pretarsus. Only in the Scutigeromorpha are they discrete, preserving their original identities.

Finally, the practical lesson here for descriptive systematics can hardly be avoided. It is not extreme to assert that many competent taxonomists familiar with lithobiid systematics, if confronted with just one bizarre male (but with no females) of this form, could justifiably be misled into suspecting it to represent at least a new species and probably a new genus, if not the basis for some suprageneric category.

A New Species of Typhlodromus (Acarina: Phytoseiidae) from Oregon [1]

By Clive D. Jorgensen [2] and D. A. Chant [3]

Chant (1957) divided the genus *Typhlodromus* Scheuten, 1857, into two subgenera: *Typhlodromus* s.str.; and *Amblyseius* Berlese. An undescribed species of mite of the subgenus *Amblyseius* is described below.

Typhlodromus (Amblyseius) crataegi new species

Female. Length 498 μ; width 325 μ. Dorsal shield smooth, almost covering idiosoma, and with 17 pairs of simple setae, nine in the lateral, two in the median, and six in the dorsal rows (Fig. 1). Setae L_4, L_9, and M_2 long (39, 69, and 57 μ, respectively). Setae D_2, D_3, D_4, D_5, D_6, and M_1 short (7–15 μ). Remaining setae of medium length (27–30 μ). Four pairs of anterior lateral setae. Seta M_1 on slight protuberance. Seta M_2 nearly level with and 22 μ mesad of L_7. Seta L_4 120 μ from L_6, 89 μ from L_5. One small pore between L_6 and L_7 and another anterior to M_2.

Setae S_1 and S_2 on interscutal membrane, 104 μ apart, and both 25 μ long. Sternal shield normal for the genus, with three pairs of setae, and with posterior margin slightly concave. Three sternal setal pairs 62, 76, and 98 μ apart, respectively, from S_1. Fourth pair of sternal setae on metasternal plates.

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[3] Entomology Research Institute for Biological Control, Belleville, Ontario.